Plant Introduction–Achievements and Opportunities in Jute and Allied Fibre Crops in India

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Collection and introduction of jute and allied fibre crop germplasm through different modes like institute efforts, correspondence, joining in National and International Programmes from early twentieth century to recent time are narrated chronologically. Variability in different traits within the collected germplasm is studied and short listed accessions are utilized as base material of useful donor parent in breeding programme for crop improvement. Role of these valuable germplasm in developing different suitable varieties is enumerated. Their impact on national productivity and in various industrial sectors has been dealt with.

Future need and scope in collecting germplasm for their utilization in developing varieties needed for diversified products are indicated for sustainability of these crops from competition with the synthetic fibres. Important traits and relevant country of rich diversity and germplasm availability in different crop species are stated for future collection and utilization as per changing industrial need of the country and for the farmers for managing their crop more remuneratively.

Plant Introduction in Forage Crops–Achievements and Opportunities

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Introduction of new germplasm of forage crops is highly important because of complex breeding behaviour of forage grasses and legumes. The fodder crops suffer from a lot of problems unique to these groups and are generally not encountered in the cultivated crops. Some of the general constraints faced with forage production and improvement include non synchronous flowering/ anthesis and spikelets maturity, abscission of spikelets after maturity in grasses, overlapping of vegetative and reproductive growth phases, uneven pod setting, maturity and shattering in legume species. In addition, apomictic nature of most of tropical forage grasses limits their genetic improvement. Hence, introduction of superior cultivars only offer logical approach for their genetic improvement.

Since ancient times Indian farmers practice mixed farming. Thus livestock and fodder are important component of agriculture and rural economy. India being a country with diverse agro-geographical zones needs a large variety of fodder crops for different zones to sustain its huge livestock population. Indian gene centers also holds rich diversity in native grasses and legumes, which have potential to become important components of pastures and rangelands. However, the wide range of genetic diversity is the pre requisite for any breeding programme in the improvement of fodder crops. The threat of genetic erosion of fodder crops is much more higher for both landraces as well as for wild relatives, due to ever increasing expansion and development of agriculture through out the tropics.

During the last few decades introduction of new species, ecotypes, biotypes, wild relatives and improved cultivars have considerably enriched the genetic diversity available in the country. It has changed significantly the scenario of fodder cultivation in the country and has contributed a lot in the animal productivity. Particular mention may be made of introduction of new crops such as Berseem (*Trifolium alexandrinum*), Oats (*Avena sativa*), Lucerne (*Medicago sativa*), Stylos (*Stylosanthes* sp.), Subabul (*Leucaena leucocepahala*) *etc.* that has contributed significantly in the fodder productivity and has completely revolutionized the fodder cultivation concept.

Introduction of wild relatives and new genotypes have considerably helped the genetic improvement programmes in many important crops. At IGFRI Jhansi concerted efforts have led to introduction of several species of *Trifolium*, *Avena*, *Stylosanthes*, *Medicago*, *Leucaena* etc. These lines are being utilized by various breeding tools for development of improved cultivars. The introductions have either been used directly as a variety or selections were made from the introduced materials. The introductions were also used as source of desirable allele for resistance to diseases, drought and lodging, grain or fodder quality and other valuable agronomic characters.

Further improved varieties/ strains in *Cenchrus, Chloris, Dichanthium, Panicum, Setaria, Stylosanthes, Desmodium, Medicago, Trifolium, Avena* and *Leucaena* could provide useful genetic resources for forage improvement programmes in India for livestock feed and fodder. Sustained efforts are required for achieving such objectives.

Plant Introduction–Achievements and Opportunities in Fruit and Plantation Crops in South Asia

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South Asia comprising of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka grows more than 40 fruit and 7 plantation crops commercially and is a centre of rich variability/gene pool for various fruit and plantation crops. Among these, India is known to be the primary centre of origin for many tropical and subtropical fruits like *aonla, bael, ber, bilimbi*, citrus, garcinia, jack fruit, *jamun, karonda, khejri, lasora,* mango, phalsa, *pilu,* tamarind, wood apple, etc and secondary centre of origin for apple, banana, cashew, coconut, mulberry, pomegranate, *Prunus, Pyrus, Rubus,* etc. Many of these fruits are also known to have major centre of diversity in other countries of South Asia. Many of the fruit crops although not originated in this region, have a wide range of variability owing to long period of domestication and diverse climatic and growing conditions resultantly a rich gene pool for genetic enhancement.

Plant introduction has been practiced since the start of crop husbandry. The early introduction of fruit and plantation crops was brought through traders, invaders, travelers etc. and was done without any specific plans. Many of today's commercial fruit and plantation crops grown are the result of these unorganized introductions. Some of the early introductions were grapes, pomegranate, sapota, loquat and custard apple. Pineapple reached India as early as 1548, guava, papaya in the sixteenth century and litchi in seventeenth century. After 1870, European and American settlers and Missionaries carried out introduction of pome, stone and nut fruits. During this period Captain Lee in Kullu valley, Coutts in Shimla and EC Stokes in Kotgarh made valuable introductions. Pychard (A French person) introduced many apple varieties in Kashmir between 1910 to 1920. As a result several temperate fruits namely apple, pear, peach, plum, apricot, walnut and almond fully adapted and established in the temperate region. Several of today's commercial cultivars were introduced during the period. Portuguese in Malabar Coast introduced cashew nut while Oil palm was introduced in India towards the end of 19th century.

In India, planned introduction of important tropical, subtropical, temperate fruits and different plantation crops was taken up in 1946 under a scheme at the Division of Botany, IARI, which was upgraded as Plant Introduction and Exploration unit in 1956 and as the Division of Plant Introduction in 1961. It was separated in 1976 as an independent institute, named as NBPGR. Over the last 28 years, NBPGR has introduced 5301 accessions of different fruit and plantation crops from more than 25 countries under strict quarantine. These collections are being maintained at various national active germplasm sites e.g. arecanut at Vittal, arid fruits at Bikaner, banana at Tiruchirapalli, cashew at Ullal and Puttur, citrus at Nagpur, coconut at Kasargod, grapes at Pune, oilpalm at Eluru, tropical fruits at Bangalore, subtropical fruits at Lucknow, temperate fruits at Srinagar